DARPA to demonstrate revolutionary drone for warfighters

Flight tests to showcase the future of VTOL unmanned aerial systems

Artist's concept of five performer designs for the DARPA ANCILLARY program's EVADE demonstration. Image shows vertical takeoff-and-landing position and forward flight orientation, to scale, for each aircraft. Source: DARPA

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Five cutting-edge unmanned aerial systems (UAS) are slated to begin flight testing later this month to highlight the versatility of vertical take-off and landing for UAS weighing less than 330 pounds.

The vertical take-off and landing (VTOL) aircraft for the demonstration, known as EVADE – Early VTOL Aircraft Demonstration – will boast significantly enhanced range, endurance and control compared to existing VTOL UAS of similar size. The primary objective for EVADE is to demonstrate rapid deployment of advanced UAS capabilities to the warfighter.

“With EVADE, our focus is on speed of development, not on first flight perfection,” says Program Manager Phillip Smith, who is a major in the U.S. Marine Corps Reserves and was previously deployed as an AV-8B Harrier pilot. “The faster we can get these demonstration aircraft airborne, the quicker we can identify and resolve any issues, and ultimately, deliver game-changing capabilities to our warfighters in the field.”

The EVADE initiative accelerates the AdvaNced airCraft Infrastructure-Less Launch And RecoverY (ANCILLARY) program Phase 2 plan, which the agency initially projected to conduct flight testing in late 2026. By prioritizing the integration of autonomy and payloads, EVADE aims to rapidly demonstrate the critical value of this UAS size class. Furthermore, by postponing specific requirements related to maximum physical dimensions and autonomous takeoff/landing in high sea states, the program has dramatically shortened the timeline to first flight.

Streamlining for rapid deployment

To further accelerate production timelines and maximize resource efficiency, all EVADE platforms leverage the Sikorsky MATRIX flight autonomy algorithms developed in the Aircrew Labor In-Cockpit Automation System (ALIAS) program. The autonomy software manages flight control and navigation needs for entire missions – from takeoff to landing – and will minimize the need for user interaction during long transit flights. Having standardized autonomy software across all five performers and designs also simplifies user engagement.

Complementing this, the Naval Surface Warfare Center Dahlgren Division’s payload management software Battle Management System (BMS) is used across all platforms, interfacing directly with the Tactical Assault Kit available to every warfighter. The integrated suite of tools will allow ANCILLARY aircraft to immediately share relevant information to individual troops at the point of need. It also effectively eliminates the need for dedicated ground control stations, thereby reducing programmatic and operational costs.

“EVADE is designed to democratize air power across the military, empowering the smallest operational units to directly receive and control an air asset when needed,” Smith says. "We're testing five potential mission sets and payloads to showcase the breadth of capabilities EVADE can provide: logistics, communications relay, weapons delivery, synthetic aperture radar, and ISR/RSTA (intelligence, surveillance, reconnaissance, and target acquisition)."

Building a robust ecosystem

The five ANCILLARY designs vary in their capabilities, but all have a minimum of 12 hours of endurance at 100 nautical miles with a 60-pound payload.

“I think of these aircraft as ‘flying trucks,’” Smith says. “They have a high load fraction for their size and VTOL configurations and can be readily adapted to support a wide range of missions by carrying the necessary payload.”

The five performers in EVADE – AeroVironment, Griffon Aerospace, Karem Aircraft, Method Aeronautics, and Sikorsky – show some of the ways these aircraft can be optimized for different strengths, including: VTOL control, airspeed, storage capacity, cruise altitude, time on station, powertrain configurations, and control methodologies.

"With ANCILLARY, we aim to cultivate a thriving supplier ecosystem for these drones, or similar-sized systems, that can fundamentally transform the capabilities and situational awareness available to every warfighter,” Smith says. "We’re invested in the success of each UAS we're testing. The U.S. military requires a diverse portfolio of performers capable of maximizing design trade-offs to achieve success across an array of mission sets."

To help accelerate transition to the field, the ANCILLARY team has worked the certification process concurrently with aircraft design and testing, while also ensuring the performers and their supply chains are ready for rapid, on-demand aircraft production.

“We’re taking a full 360 look at what it takes – considering performance, cost, usability, interoperability, certification, manufacturing, etc. – to ensure we rapidly deliver a game

changing capability," Smith says. "We've got five outstanding American companies we expect to be ready to accept and deliver orders at scale within the upcoming budget year."

Broadening access to advanced capabilities

The ANCILLARY program was designed to meet anticipated future needs based on input from individuals across the DOD. The 330 pound (150 kilogram) maximum gross takeoff weight threshold for ANCILLARY aircraft was a foundational design decision, expected to help accelerate the path to acquisition, operation, and maintenance.

Classification of UAS into various categories based on size and capabilities remains an evolving discussion, including within the DOD. A Congressional Research Service "In Focus" report from October 2024 provides context for how DOD and other entities categorize UAS, as well as highlighting ongoing policy considerations.

"ANCILLARY fills a critical gap, bringing operational capabilities comparable to much larger – Group 4 and 5 – drones to smaller units, such as Army, Marine Corps, special operations units or a ship's company," Smith says. "These drones can be deployed without additional infrastructure or equipment, even in austere environments – offering a game-changing toolset for warfighters."

Looking ahead

The ANCILLARY program is structured to facilitate rapid spiral development – an iterative model that reduces risk throughout the design lifecycle of the demonstration aircraft – to improve existing features and add new capabilities. Examples include additional weather hardening, adding the autonomy algorithms and sensors necessary for takeoff and landing at sea during storms, and improving engine efficiency, among other enhancements. DARPA will not necessarily carry out all the planned development spirals, but the path is in place.

Following successful flight testing this summer, DARPA intends to transition the aircraft and capabilities developed under the ANCILLARY program to the U.S. military services by the end of the 2025 calendar year.

Editor's note: This news update was edited on June 27, 2025 to amend the reference to UAS categories and include a hyperlink to a report with further details.

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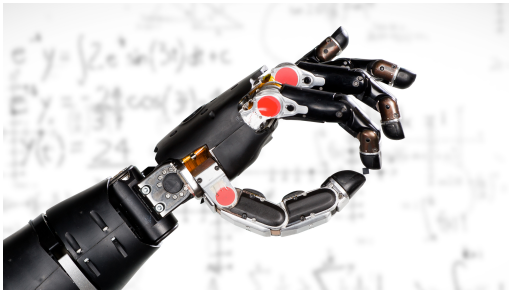

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